

Magnetic force pulls baby reef fish back home

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Adult Cardinal fish hover around the entrance of a cave where they live. Credit: Michael Kingsford

Baby reef fish have an internal magnetic 'compass' that directs them home at night, world-first research has revealed.

Professor Mike Kingsford from the ARC Centre of Excellence for Coral Reef Studies at James Cook University collaborated with colleagues in Germany to find out how tiny Cardinal fish, the size of a fingernail, are able to swim towards home when there's no sun or stars to guide them.

"This study is the first clear demonstration that [reef fish](#) larvae possess magnetic senses to orient them at night," says Professor Kingsford. "Up until now, we only knew adult birds, marine mammals, sharks and boney fish have this in-built sense of direction."

"We collected Cardinal fish, less than one cm long, from One Tree Island on the Great Barrier Reef and tested their orientation in total darkness using the same magnetic field as the Reef," Professor Kingsford says.

"Normally, fish orientated to the south east, but when we altered the magnetic field clockwise by 120 degrees, there was a significant change in the direction the fish swam. They all turned further west, thinking they were still on track to their destination."

"Our results show that larvae can use their magnetic senses to point them in the right direction when it's night time.

"We know from our previous research that once they start to get closer to their target, a 'homing process' begins, where the larvae rely on odor, sounds and landmarks to find and settle on a reef."

Reef fish hatch from eggs into a larval form and disperse for days to months in the ocean before either returning home or finding another reef to settle. Once they get to a reef they generally stay there for a lifetime.

"The study tells us these baby fish actually have brains. They know where they are going and are strong swimmers. As a result they have

some control over the [reef](#) they end up on. It's not just about being led by the currents."

"Knowing this, we can develop more accurate models of where larvae go to determine the best way to protect and maintain sustainable [fish](#) stocks."

More information: Michael Bottesch et al, A magnetic compass that might help coral reef fish larvae return to their natal reef, *Current Biology* (2016). [DOI: 10.1016/j.cub.2016.10.051](https://doi.org/10.1016/j.cub.2016.10.051)

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